PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Halbert Reservoir

Prepared by:

Richard A. Ott, Jr., District Project Leader
and
Daniel L. Bennett, Assistant District Project Leader

Inland Fisheries Division
District 3-C, Tyler, Texas

Carter P. Smith
Executive Director

Gary E. Saul, PhD
Director, Inland Fisheries

July 31, 2011

TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Halbert were surveyed in 2010 using electrofishing and trap netting and in 2011 using gill netting. Vegetation and angler access surveys were conducted in August 2010. This report summarizes results of these surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Lake Halbert is a 531-acre reservoir on Elm Creek, a tributary of the Trinity River, constructed by the City of Corsicana in 1921 to provide water for municipal and industrial purposes. Boat access is adequate, and a fishing pier is available. In addition, shoreline access is available in the park along the west bank. High turbidity limits growth of submersed aquatic vegetation and likely has a negative impact on largemouth bass reproduction. A prolonged drought in 2005-2006 reduced reservoir capacity to approximately 28%, and the reservoir was closed to recreation. Littoral habitat continued to be sparse.

- **Management History:** Important sport fish include channel catfish, white bass, largemouth bass, and white crappie. The management plan from the 2003 survey report included: constructing brush shelters, installation of a fish feeder on the fishing pier, and distribution of regulation posters to area businesses; no survey was conducted in 2006 due to low water level. The fish community continues to be managed under statewide harvest regulations.

- **Fish Community**
  - **Prey species:** Electrofishing catch of gizzard shad in 2010 was lower than in 2003 but most were small enough to be available as prey to sport fish. Threadfin shad were not collected in 2003 but were collected in 2010. Combined electrofishing catch rate of sunfishes was 95/h and although most were small enough to be consumed by predators they are unlikely to support a fishery.

  - **Catfishes:** Blue catfish were not collected prior to 2003 but since have become the dominant catfish species; their size distribution was very good. Channel catfish continue to exhibit low abundance and few are of legal length.

  - **White bass:** White bass continued to exhibit inconsistent recruitment and low abundance, likely due to limited spawning habitat. Body condition of white bass in most size classes was poor.

  - **Largemouth bass:** Electrofishing catch rate of largemouth bass ≥8 inches was higher than historical surveys and size distribution was within the target range for a balanced fish community. Body condition was extremely variable by size group. Growth analysis indicated that few largemouth bass reach legal length before age 4. It is likely that high turbidity limits the ability of largemouth bass to feed effectively.

  - **Crappie:** Trap net catch rate of white crappie was approximately 25% of the historical range. Size distribution was good but body condition declined with increasing length, suggesting limited prey availability.

- **Management Strategies:** Standard surveys will be conducted in 2014-2015 to monitor sport fish and prey populations. Continue soliciting assistance in building and deploying structural habitat. Continue to monitor the expanding blue catfish population during routine gill netting in 2015; seek additional opportunities to promote the fishery. Maintain communication with the City of Corsicana to monitor the status of pipeline development to Lake Halbert from Richland-Chambers Reservoir. Conduct a quantitative assessment of the aquatic plant community and evaluate angler access during routine habitat survey in 2014.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Halbert from June 2010 through May 2011.The purpose of this document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fish was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2010-2011 data for comparison.

Reservoir Description

Lake Halbert is a 531-acre reservoir on Elm Creek, a tributary of the Trinity River, constructed by the City of Corsicana in 1921 to provide water for municipal and industrial purposes. Boat access is adequate, and a fishing pier is available. In addition, shoreline access is available in the park along the west bank. Other descriptive characteristics for Lake Halbert are presented in Table 1. High turbidity and frequent water level fluctuations limit growth of submersed aquatic vegetation and likely has a negative impact on largemouth bass reproduction. A prolonged drought in 2005-2006 reduced reservoir capacity to approximately 28%, and the reservoir was temporarily closed to recreation. (Figure1).

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Bister and Ott 2003) included:

1. Contact the City of Corsicana Parks and Recreation Department regarding brush reef construction.
   Action: Although tentative approval was obtained from the controlling authority no angler group was found to partner on the project.
2. Contact the City of Corsicana Parks and Recreation Department regarding installation of fish feeders on the fishing pier.
   Action: Recommendations were made to the controlling authority but no action has been taken.
3. Provide lake-specific regulation posters to vendors of angling-oriented businesses serving the Lake Halbert vicinity. Maintain regulation signs previously posted at public and private boat ramps on Lake Halbert.
   Action: Regulation posters were created and distributed.

Harvest regulation history: All sport fishes in Lake Halbert are managed with statewide harvest regulations (Table 2). Regulations have not changed since the last survey.

Stocking history: Lake Halbert was first stocked with Florida strain largemouth bass (*Micropterus salmoides floridanus)* in 1974 and was restocked in 1992, 1995 and 1998 (Table 3). Coppernose bluegill (*Lepomis macrochirus purpurescens*) were stocked once in 1983. Management stocking of threadfin shad (*Dorosoma petenense*) was conducted in 1990 and 1991.

Vegetation/habitat history: High turbidity and frequent water level fluctuations limit growth of submersed aquatic vegetation at Lake Halbert. Bister and Ott (2003) reported littoral habitat was poor and although 75% of the shoreline had aquatic vegetation or flooded terrestrial vegetation, the total vegetated area was minimal and offered little benefit to fishes. A prolonged drought in 2005-2006 reduced reservoir capacity to approximately 28% (Figure 1) further limiting submersed aquatic vegetation. Because previous plant community information was listed by growth form and linear shoreline distance rather than by species and area, direct comparison is limited to qualitative assessment only. Aquatic species community composition continues to be dominated by emergent growth forms and overall species diversity and coverage remain low.

Water transfer: Lake Halbert is used primarily as a water supply for municipal and industrial purposes, and for flood control. There is currently one permanent pump station and treatment facility on the reservoir. An additional 36 inch pipeline has been constructed to Richland-Chambers Reservoir. When

the pump station for this pipeline is completed (mid Summer 2011) it will allow Richland-Chambers Reservoir water to be pumped directly to the City of Corsicana water treatment facility or be diverted first to Lake Halbert and then to the water treatment facility. The City of Corsicana maintains a second permanent pump station and treatment facility on Navarro Mills Reservoir. Water from the two sources are blended after leaving the treatment facilities but prior to distribution. Treated effluent from the City of Corsicana waste-water treatment plant is discharged into Richland-Chambers Reservoir.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). All survey stations were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). A vegetation survey and angler access survey were conducted in August 2010.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad *(Dorsoma cepedianum)*, (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. For largemouth bass, ages were determined for all fish with lengths ranging from 5.3-19.3 inches, using otoliths from 40 specimens. For white crappie *(Pomoxis annularis)*, ages were determined using otoliths from 11 specimens ranging from 9.2-10.9 inches. Water level data were obtained from the United States Geological Survey web site (USGS 2010).

RESULTS AND DISCUSSION

Habitat: Aquatic plant community dominance is similar by growth form to that reported by Bister and Ott (2003). Previous plant community information was listed by growth form and linear shoreline length only preventing quantitative comparison. Native emergent species are still the dominant growth form. Smartweed *(Polygonum spp.)* and American lotus *(Nelumbo lutea)* occupied approximately 5.4% of the reservoir surface area (Table 4). Other emergent species identified included: bulrush *(Scirpus spp)*, cattail *(Typha spp.)* and water willow *(Justicia americana).* Native submersed species were less abundant with pondweed *(Potamogeton spp.)* occupying less than 2% (9.4 acres). Low species diversity and overall coverage of aquatic vegetation is likely due to turbidity and frequent water level fluctuation. Giant reed *(Arundo donax)* was the only non-native plant species identified in the vegetation survey. Bister and Ott (2003) reported that most of the shoreline habitat was featureless with 13% riprap by length.

Prey species: Electrofishing catch of gizzard shad in 2010 (71/h) was lower than in 2003 (122/h) and 1997 (144/h), suggesting a declining trend in relative abundance (Figure 2). However most gizzard shad were $\leq$ 6 inches, resulting in a high (89) Index of Vulnerability (IOV). Threadfin shad were not collected in the prior electrofishing survey in 2002 (Bister and Ott 2003) but were collected in the current survey (Appendix A). Bluegill CPUE was low in 2010 (36/h) (Figure 3) and exhibited a declining trend in abundance over the same time period as gizzard shad. Although body condition was high for all size classes ($W_r \geq 100$), small sizes of bluegill collected were unlikely to support a fishery. Longear sunfish (*Lepomis megalotis)* CPUE (48/h) was higher than bluegill and contributed to the prey base but were unlikely to support a fishery due to their small size (Figure 4).

Catfish: Blue catfish *(Ictalurus furctatus)* were not collected at Lake Halbert in surveys prior to 2003 but have become the dominant catfish species since that time. No recorded stocking of blue catfish has been conducted by TPWD (Table 3), so the mechanism of introduction is unknown. The low-density population observed in 2003 consisted of one mature adult and one sub-adult specimen (Figure 5). Gill net catch rate in 2011 (6.8/nn) was moderate, comprised of multiple size groups with most available for harvest.

Body condition was moderate ($W_r \geq 90$) for most size classes and indicated adequate prey availability.

Channel catfish *(I. punctatus)* relative abundance in 2011 (gill net CPUE = 2.2/nn) was similar to 2003 (2.2/nn) and 1997 (1.2/nn), but size distribution remained poor (PSD =0); only two legal-length specimens were collected (Figure 6). Body condition for stock-length (≥11 inch) channel catfish was also low ($W_r \leq 80$) and indicates inadequate food.

White bass: The gill net catch rate of white bass *(Morone chrysops)* (0.8/nn) was lower than in 1997 or 2003 (1.8/nn and 3.4/nn, respectively). Spawning habitat for white bass is limited. Gaps in the size distribution (Figure 7) suggest inconsistent recruitment. Body condition was generally poor ($W_r < 90$) and suggests limited prey availability. It is unlikely that this species provides a quality fishery at Lake Halbert.

Largemouth bass: Electrofishing catch rate of largemouth bass (40/h) was relatively low, but similar to previous surveys (50/h, 1997; 32/h, 2002) (Figure 8). Electrofishing CPUE of stock-length (>8 inches) largemouth bass (30/h) was higher than previous surveys and size distribution (PSD=57) was within the target range of 40-70 for a balanced fish community (Anderson 1980). Body condition (W_r) varied considerably by size, ranging from less than 70 to over 110. Growth analysis indicated few largemouth bass reach 14 inches before age 4 (Figure 9). Mean length at ages 1, 2, and 3 was 10.2, 12.3, and 13.3 inches, respectively. Low prey relative abundance and high turbidity likely limit largemouth bass feeding efficiency.

Crappie : Trap net CPUE of white crappie (9.8nn) was approximately 25% of previous surveys (39.2/nn, 1997; 46.2/nn, 2003) (Figure 10). Size distribution was good (PSD of 57). Body condition (W_r) declined with increasing length, suggesting limited prey availability as crappie shift to a picivorious (i.e. fish) diet. Growth was moderately slow. Average age of white crappie at 10 inches (9.2-10.9 inches) was 2.6 years (N = 12, range 1-3 years).

Fisheries management plan for Lake Halbert, Texas

Prepared – July 2011

ISSUE 1: Littoral structure to provide cover for small fish and attachment of benthic organisms is insufficient in the reservoir.

MANAGEMENT STRATEGY

1. Continue soliciting assistance from area angling clubs in constructing and deploying structure-based habitat.

ISSUE 2: Blue catfish first collected in 2003 have become the dominant catfish species and provide the best potential fishery at Lake Halbert.

MANAGEMENT STRATEGIES

1. Promote the blue catfish fishery through media outlets.
2. Monitor changes in blue catfish population through standard gill net sampling in spring 2015.

ISSUE 3: Water level fluctuation has become more extreme as the demand from the City of Corsicana has increased. Water level has reached conservation pool only once in since 2000.

MANAGEMENT STRATEGY

1. Maintain communication with the City of Corsicana to determine when the proposed pipeline to Richland-Chambers Reservoir becomes operational. Recommend reservoir operation that benefits fisheries.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Invasive vegetation species such as giant salvinia (*Salvinia molesta*) can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and inter-basin transfer of water is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Coordinate with Corsicana Parks & Recreation Department to post appropriate signage at access points around the reservoir.
2. Contact and educate local outdoor oriented businesses about invasive species, and provide posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.
6. Conduct a quantitative assessment of the aquatic plant community during routine habitat survey in 2014.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard monitoring in 2014-2015 (Table 5).

LITERATURE CITED

Anderson, R. O. 1980. Proportional stock density (PSD) and relative weight (W*r*): interpretive indices for fish populations and communities. Pages 27-33 *in* S. Gloss and B. Shupp, editors. Practical fisheries management: more with less in the 1980's . Workshop proceedings, New York chapter, American fisheries Society, Ithica, NY.

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Bister, T. J, and R. A. Ott. 2003. Statewide freshwater fisheries monitoring and management program survey report for Lake Halbert 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-28, Austin. 24 pp.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): A Further Refinement of Population Size Structure Index Terminology. Fisheries 32(7):348.

United States Geological Survey. 2010. *Real-time Data for Texas lakes and Reservoirs* http://waterdata.usgs.gov/tx/nwis/uv/?site_no=08063590&

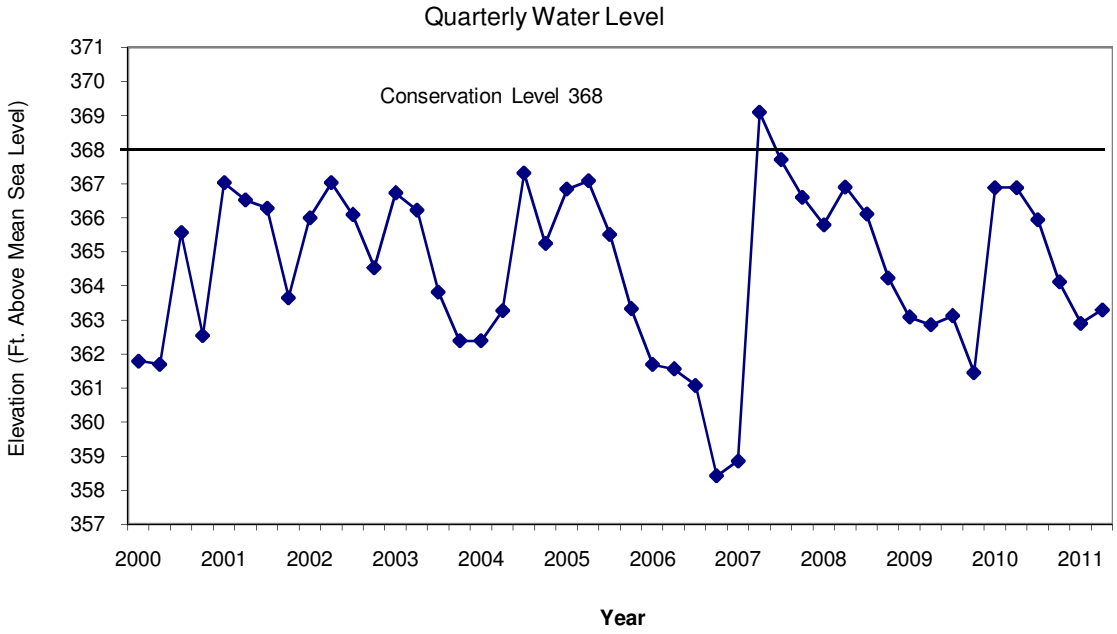


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Halbert, Texas. Horizontal line represents conservation level.

Table 1. Characteristics of Lake Halbert, Texas.

Characteristic	Description
Year completed	1921
Controlling authority	City of Corsicana
County	Navarro
Reservoir type	Tributary
Shoreline Development Index (SDI)	1.8
Conductivity	280 umhos/cm

Table 2. Harvest regulations for Lake Halbert, Texas.

Species	Bag Limit	Minimum-maximum length (inches)
Catfish: channel and blue, their hybrids and subspecies	25 (in any combination)	12–No limit
Catfish, flathead	5	18–No limit
Bass, white	25	10–No limit
Bass, largemouth	5	14–No limit
Crappie: white and black, their hybrids and subspecies	25 (in any combination)	10-No limit

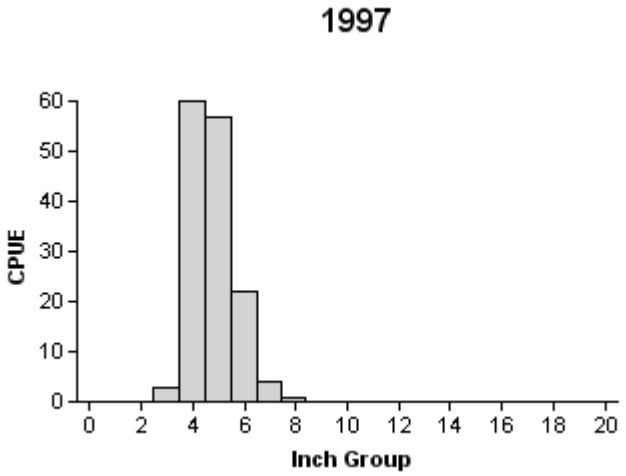
Table 3. Stocking history of Lake Halbert. Size categories are: FGL =1-3 inches; ADL = adults.

Species	Year	Number	Size
Threadfin shad	1990	3,367	ADL
	1991	2,700	ADL
	Total	6,067	
Bluegill (copper nose)	1983	35,000	FGL
	Total	35,000	
Florida largemouth bass	1974	32,000	FGL
	1975	25,000	FGL
	1992	59,984	FGL
	1995	66,340	FGL
	1998	65,289	FGL
	Total	248,613	

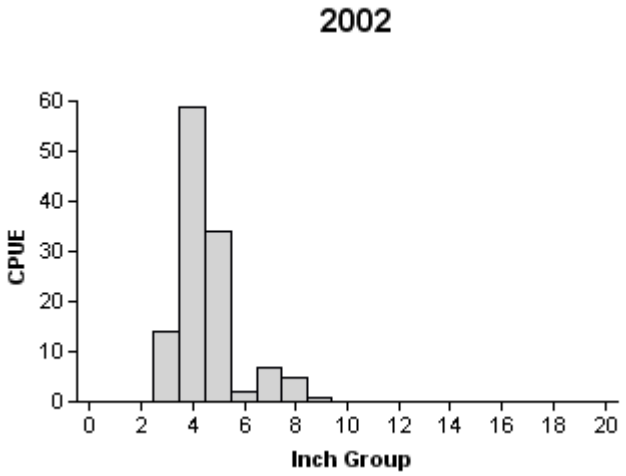
Table 4. Vegetation survey was conducted in 2010. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Surface area	
	Acres	Percent of reservoir surface area
Native emergent		
American lotus	0.5	0.1
Bulrush	tr	tr
Cattail	0.3	<0.1
Smartweed	28	5.3
Water willow	tr	tr
Native submerged		
Pondweed	9.4	1.8
Non-native		
Giant Reed	0.7	0.1

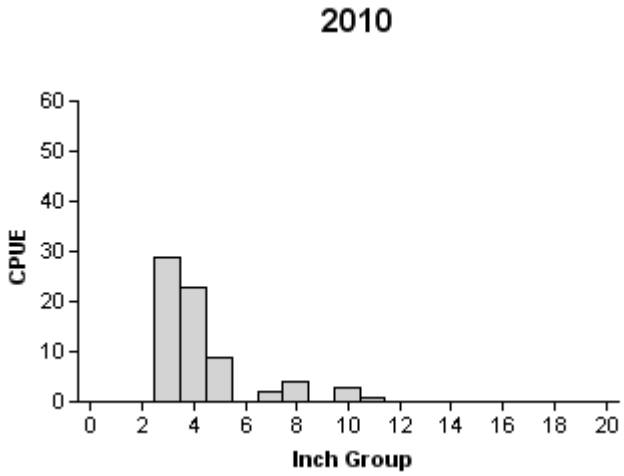
Gizzard shad



Effort = 1.0
Total CPUE = 147.0 (23; 147)
Stock CPUE = 5.0 (81; 5)
IOV = 99 (0.8)



Effort = 1.0
Total CPUE = 122.0 (30; 122)
Stock CPUE = 13.0 (29; 13)
IOV = 95 (2.5)



Effort = 1.0
Total CPUE = 71.0 (25; 71)
Stock CPUE = 10.0 (41; 10)
IOV = 89 (7)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parenthesis) for fall electrofishing surveys, Lake Halbert Texas, 1997, 2002, and 2010.

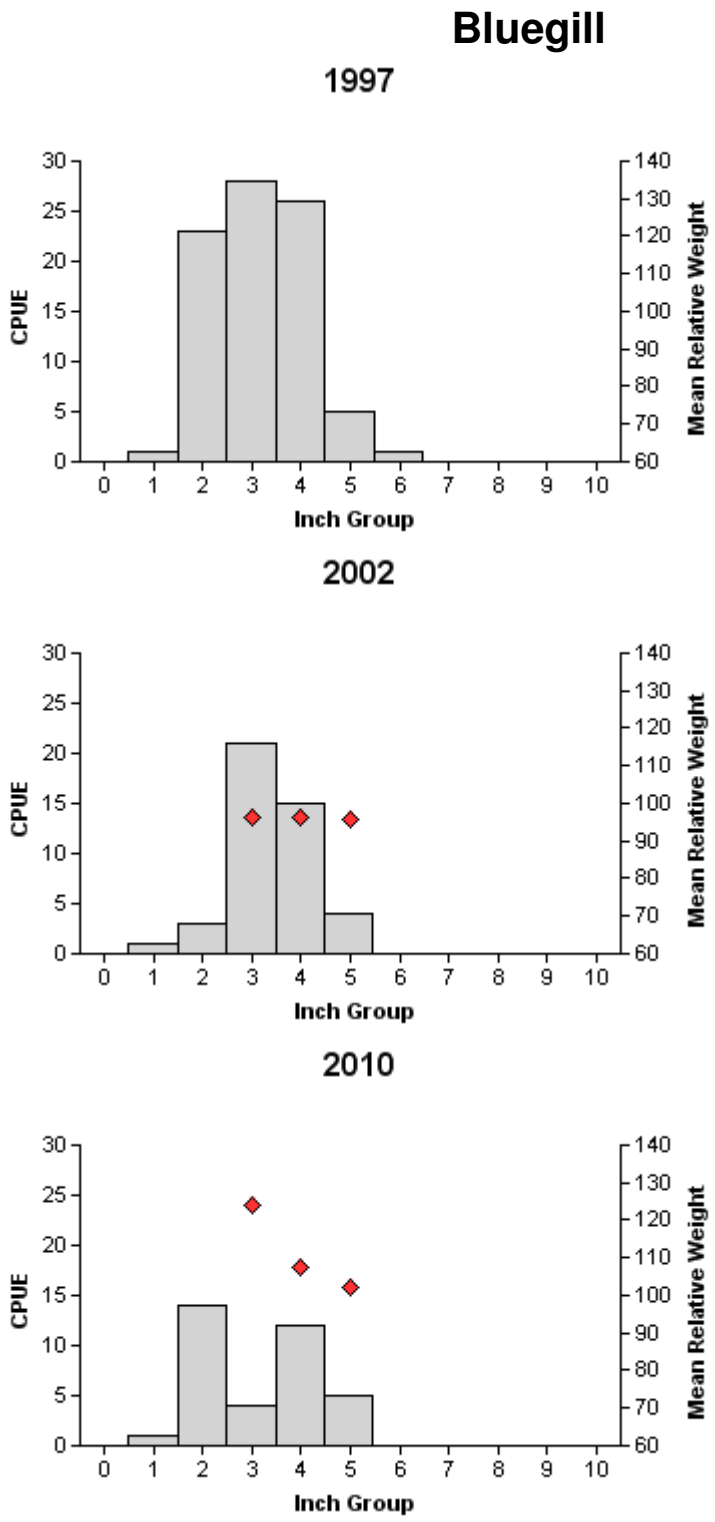


Figure 4. Number of bluegill caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Halbert, Texas, 1997, 2002, and 2010.

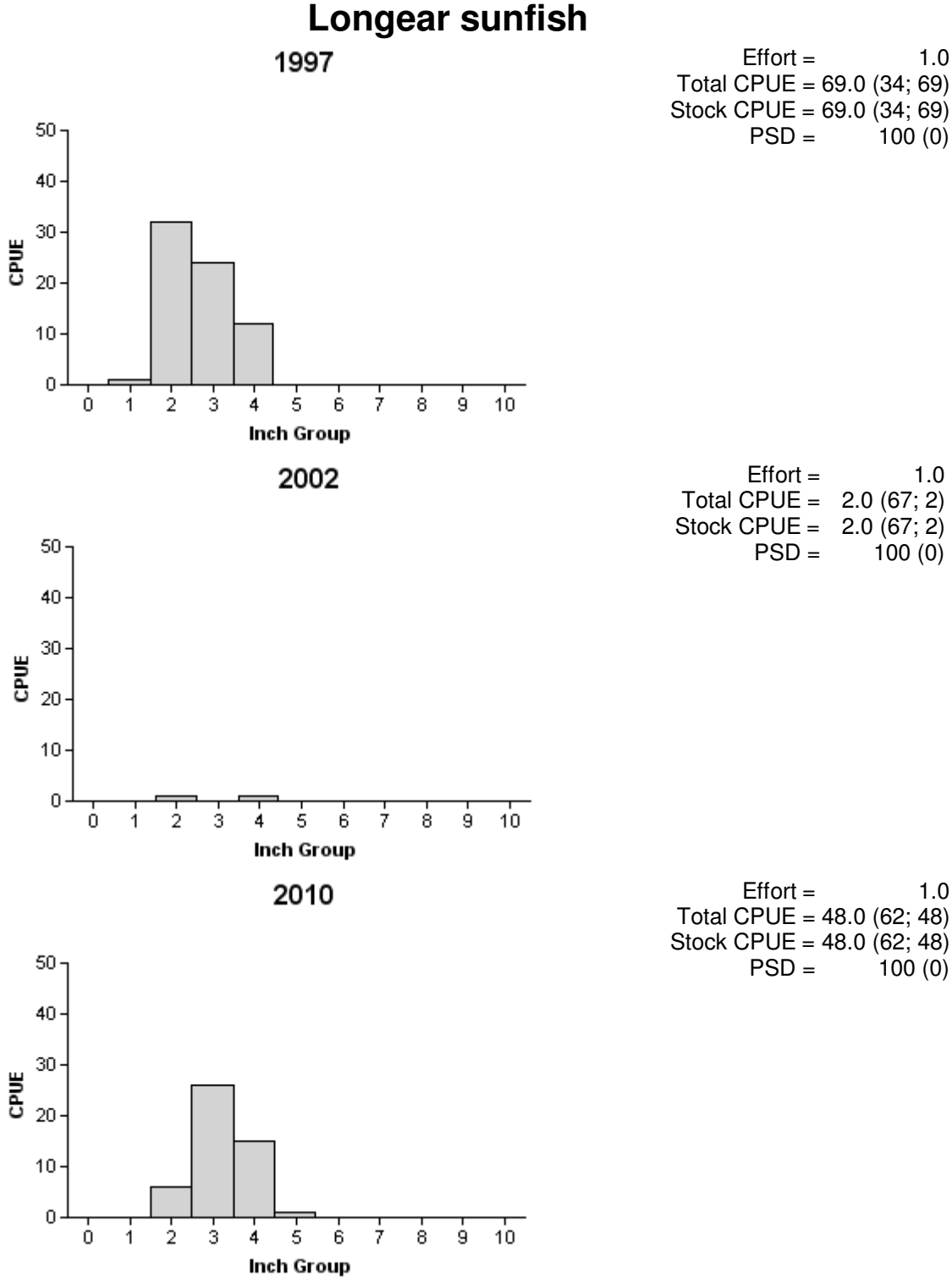
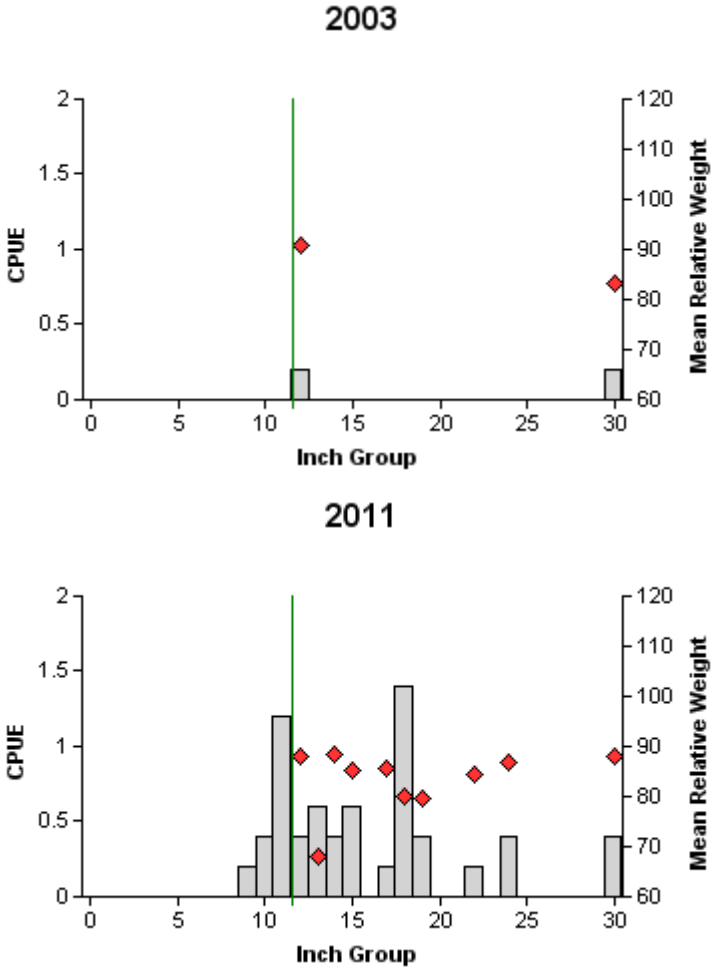


Figure 4. Number of longear sunfish caught per hour (CPUE, bars), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Halbert, Texas, 1997, 2002, and 2010.

Blue catfish



Effort =	5.0
Total CPUE =	0.4 (100; 2)
Stock CPUE =	0.4 (100; 2)
PSD =	50 (0)
PSD-12 =	100 (0)

Effort =	5.0
Total CPUE =	6.8 (35; 34)
Stock CPUE =	5.0 (42; 25)
PSD =	20 (6.2)
PSD-12 =	100 (0)

Figure 5. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Halbert, 2003 and 2011; no blue catfish were collected in the 1997 survey. Vertical line represents length limit at time of survey.

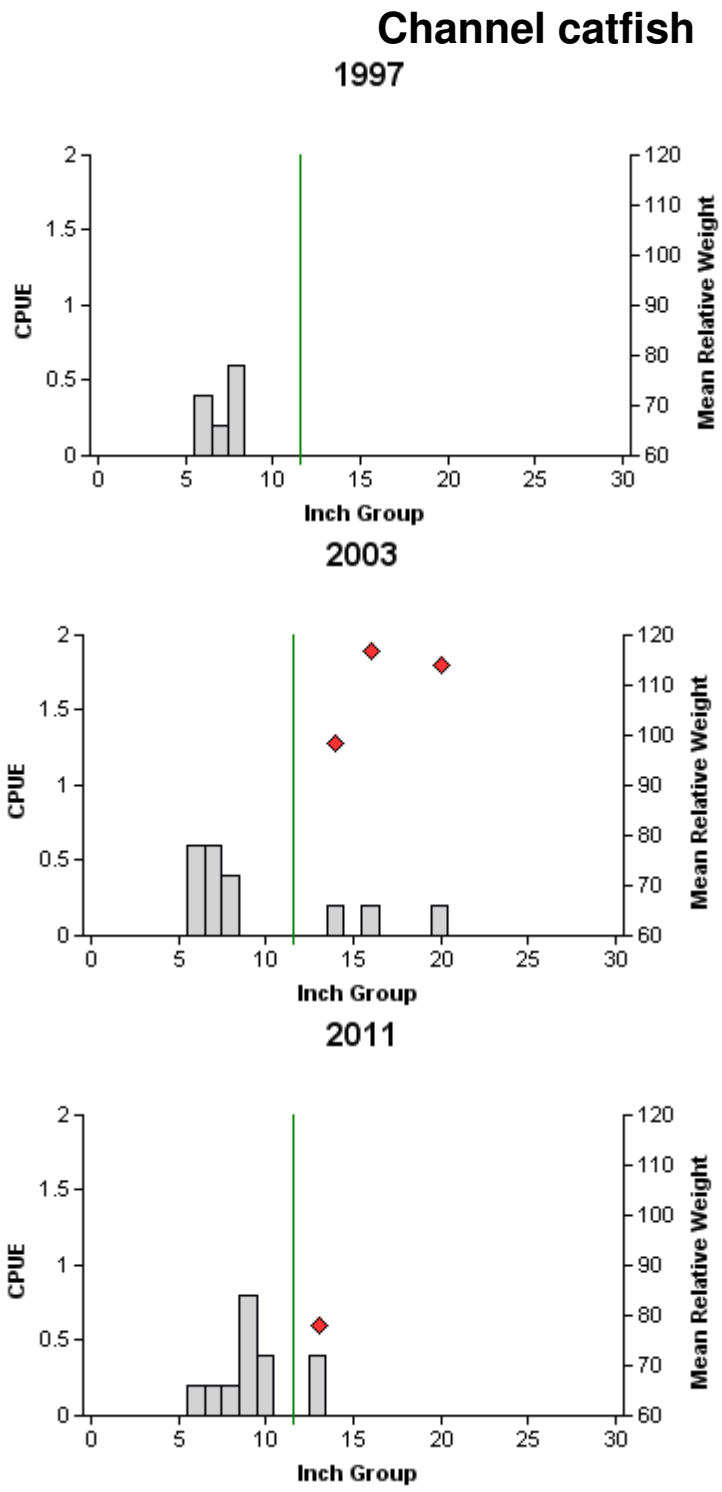


Figure 6. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Halbert, Texas, 1997, 2003, and 2011. Vertical lines represent length limit at time of survey.

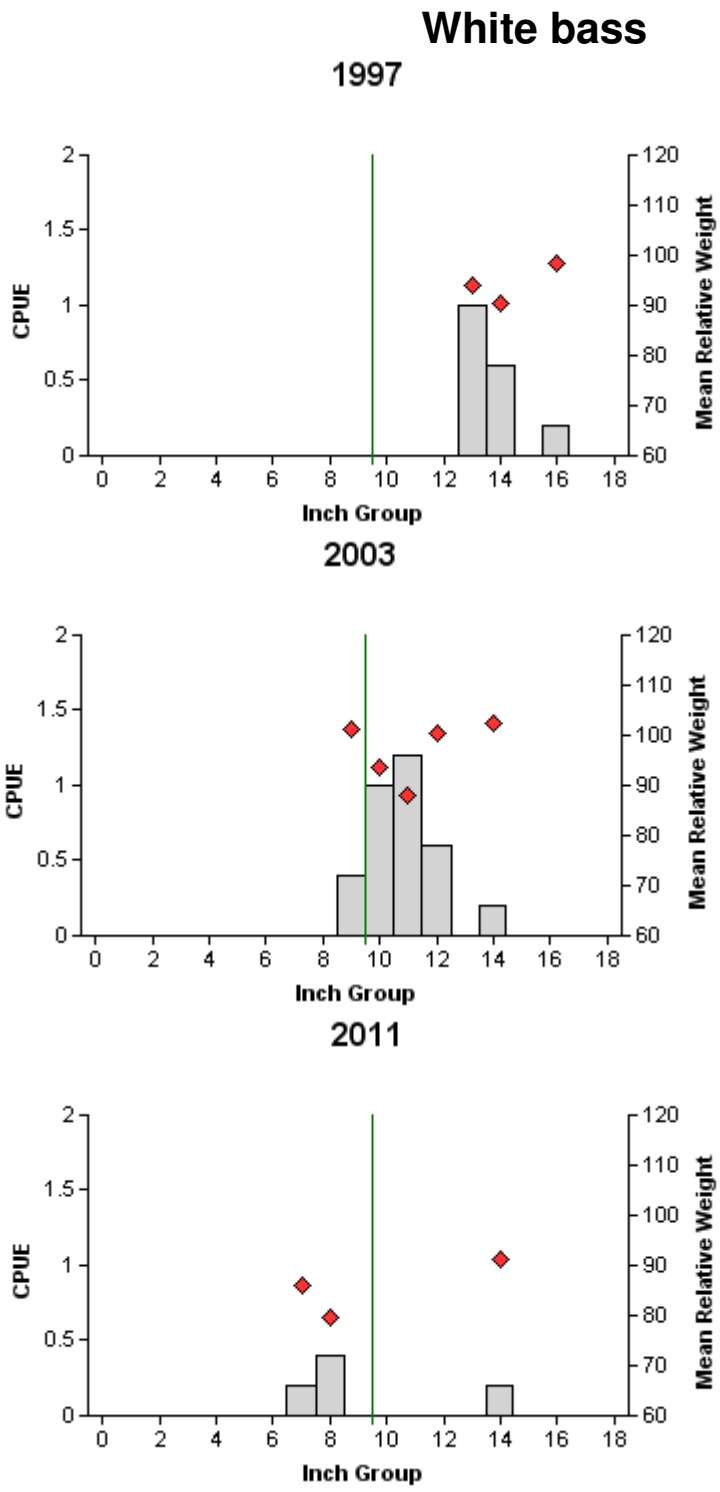


Figure 7. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Halbert, Texas, 1997, 2003, and 2011. Vertical lines represent length limit at time of survey.

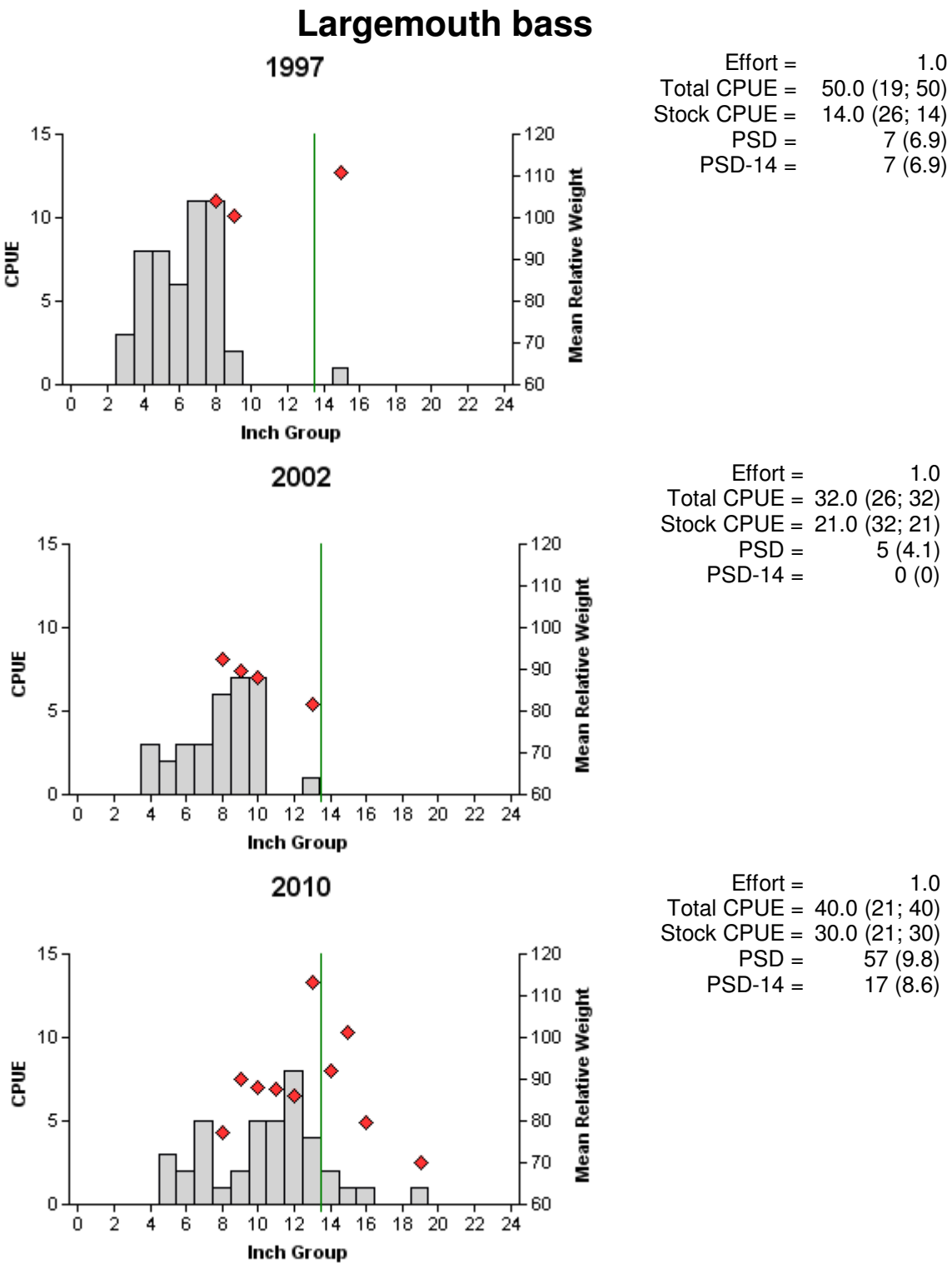


Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Halbert, Texas, 1997, 2002, and 2010. Vertical line represents length limit at time of survey.

Largemouth bass

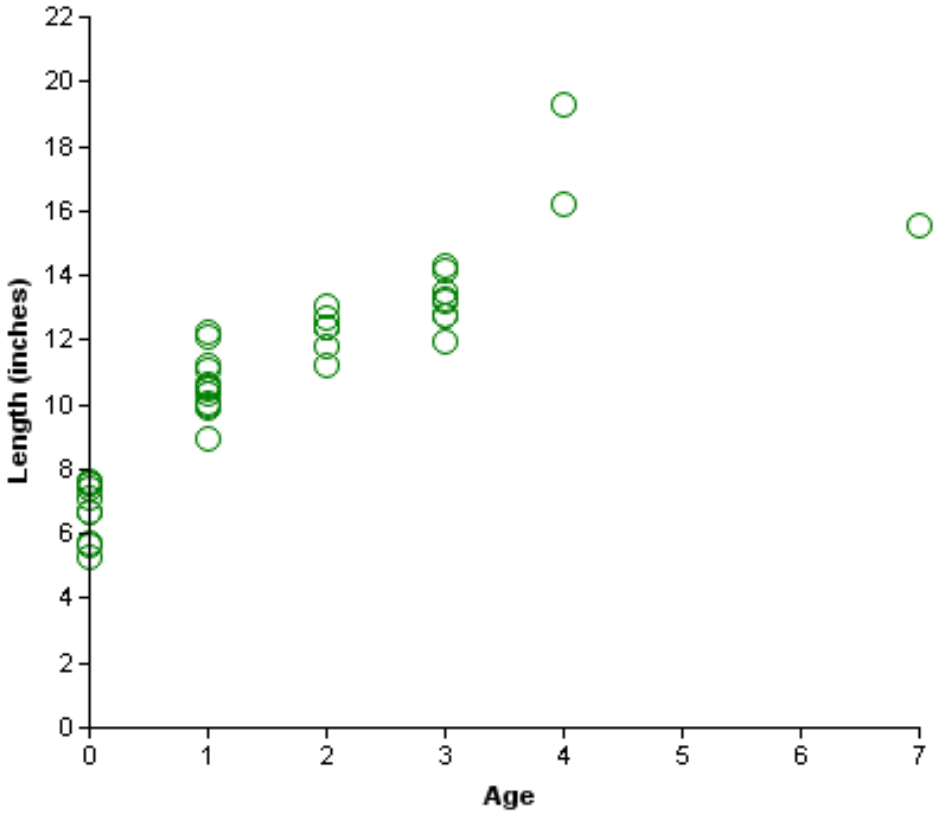


Figure 9. Length at age (inches) of largemouth bass (N=40) (sexes combined) collected in fall electrofishing, Lake Halbert, Texas October, 2010.

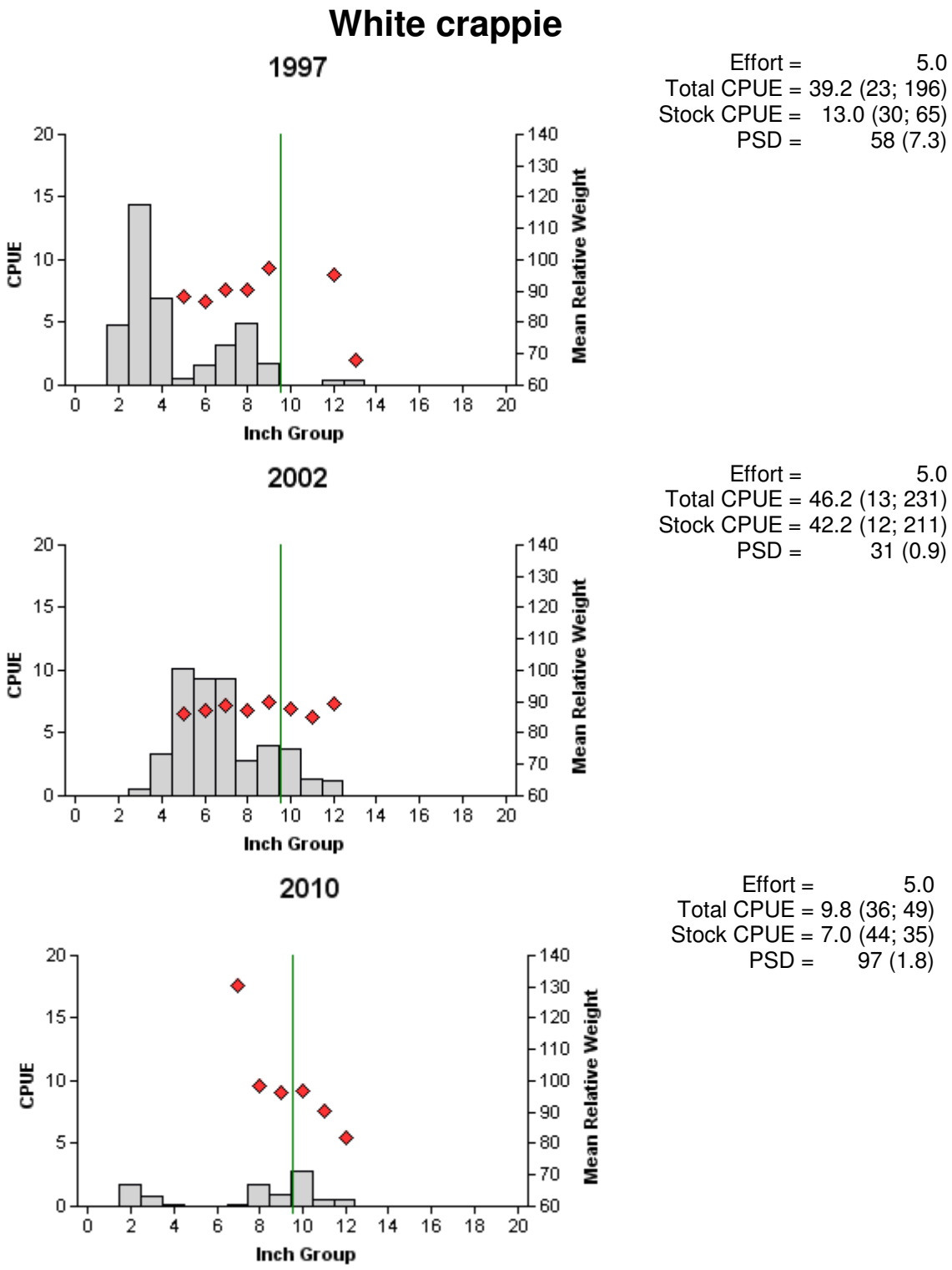


Figure 10. Number of white crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Halbert, Texas, 1997, 2002, and 2010. Vertical line represents length limit at time of survey.

Table 5. Proposed sampling schedule for Lake Halbert, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

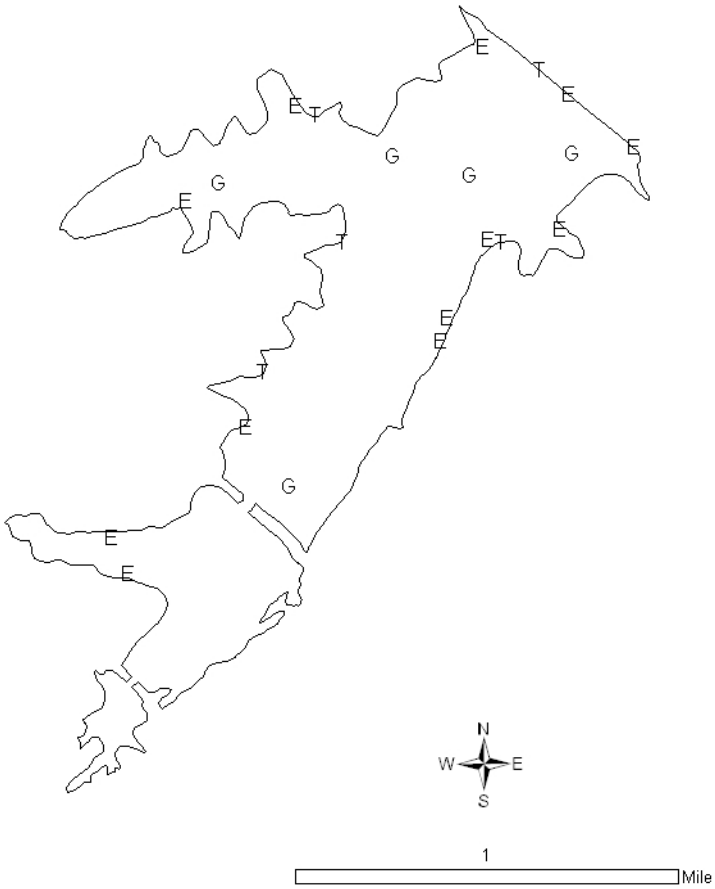
Survey Year	Electrofisher	Trap Net	Gill Net	Vegetation	Access	Report
2011-2012						
2012-2013						
2013-2014						
2014-2015	S	A	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Halbert, 2010-2011.

Species	Gill netting		Trap netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					71	71.0
Threadfin shad					11	11.0
Blue catfish	34	6.8				
Channel catfish	11	2.2				
White bass	4	0.8				
Warmouth					8	8.0
Bluegill					39	39.0
Longear sunfish					48	48.0
Largemouth bass					40	40.0
White crappie			49	9.8		

APPENDIX B



Location of sampling sites, Lake Halbert, Texas, 2010-2011. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively.